

suffered, in general appreciation, from the fact that—in their essential features—they never attempted to gratify popular taste; that they did not, with rare exceptions, illustrate<sup>1</sup> the works of fashionable writers, whether classical philosophers or mediæval prelates; that they had no connection with the legends and dreams of chivalry and romance; that they were not the work of schools or courts; and that they owed nothing to Ptolemy or Strabo. But we know their worth better now.

They first record for us the new discoveries among the Atlantic islands and along the African mainland; they guide and accompany the faltering steps of our race in the outward, oceanic, movement of European life; in them true cartography, the map-making of the civilised world, begins.

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### GEOLOGICAL NOTES.

STATISTICS of mineral production in India in the ten years 1894 to 1903 have been issued by the Government of India (Department of Revenue and Agriculture, 1904). In the report for 1903 satisfactory progress in the mining industry is recorded. There has been a remarkable development in the production of petroleum and manganese ore, and a continuation of the progress previously recorded for coal and gold.

From the Geological Survey of India we have received part ii. of the newly re-issued *Records*. Mr. T. H. Holland, director, contributes a short appreciative memoir of the late General C. A. McMahon, and among other articles there is a well illustrated report by Mr. J. Malcolm MacLaren on the auriferous occurrences of Chota Nagpur, in Bengal. The conclusion is that there is little scope for the legitimate investment of capital in the recovery of gold, whether from the quartz veins or from the superficial deposits, but that the greater portion of the gold must be left to the native washer, "forming for him a reserve that, though it will never raise him to affluence, will always lift him beyond the grasp of famine." Two minerals, thenardite and cancrinite, are recorded for the first time from India. We have also received a report on the geology of Spiti, by Mr. H. H. Hayden (*Mem. Geol. Surv. India*, vol. xxxvi., part i.). Hitherto no systematic survey had been made of the region, and the results of this work, which was carried out by Mr. Hayden with the assistance of the late Dr. von Krafft, are depicted on a map to the scale of one inch to four miles, and further illustrated by some striking pictorial views and sections. The formations represented are Cambrian, Silurian, Carboniferous and Permian, Trias, Jurassic, and Cretaceous, with also intrusive rocks. The oldest sedimentary rocks belong to the Middle Haimanta division of Mr. Griesbach; they are unfossiliferous, and are overlain presumably by the Upper Haimantas, in which *Lingulella* and *Olenus* have been found. Lower and Upper Silurian rocks are recognised, and from these and the later formations many fossils are recorded.

The ammonite fauna of the Spiti shales forms the subject of a monograph by Dr. Victor Uhlig (*Mem. Geol. Surv. India*, ser. xv., vol. iv.). Only the first portion of this work has at present been issued, and in it the author deals with the genera and species of Ammonoidea. With regard to the classification, the author remarks that as no universally satisfactory agreement has yet been reached, he gives the descriptions of the various forms in unclassified sequence, while indicating their approximate position. In the course of his work he has studied as far as possible all the old as well as new material, and he has found it necessary to re-figure and describe many of the species previously published.

In mineralogical notes contributed by Mr. A. K. Coomaraswamy (*Spolia Zeylanica*, August), reference is made to the occurrence in Ceylon of thorium-bearing minerals, of corundum-sillimanite rocks, kyanite, serendibite, &c. The same author, in dealing with the geology

of Ceylon (*Geol. Mag.*, August), proposes the name Balangoda group for a series of granitic and pegmatitic rocks intrusive in the Charnockite series. The group includes granites with zircon, allanite, magnetite, &c.

The summary of progress of the Geological Survey for the year 1903 contains the usual particulars of the field work which has been carried on in Cornwall, Derbyshire and Nottinghamshire, Carmarthenshire and Pembrokeshire, in various parts of Ross-shire and the western highlands, in the Edinburgh coal-field, and in the neighbourhood of Cork in Ireland. Special attention is directed to the discovery in Ross-shire of a rock essentially composed of magnetite and cassiterite—the occurrence of tin-ore being new; but it is stated that at present there is no reason to believe that the tin-bearing rock occurs in any large masses. In an appendix Dr. J. S. Flett contributes first notes on the petrography of western Cornwall, dealing with some of the garnetiferous greenstones, the granites and greisen veins, and the phenomena of contact alteration; Mr. H. B. Woodward writes on the Geological Survey in reference to Agriculture, with report on the soils and subsoils of the Rothamsted estate; and Mr. H. A. Allen continues the important catalogue of types and figured specimens of fossils in the Museum of Practical Geology, with a record of Oolitic Gasteropoda and Scaphopoda.

The general report and statistics on mines and quarries for 1903, part iii. (output), has been issued by the Home Office. The total value of the minerals raised during the year showed a decrease of 5¼ million pounds as compared with 1902—a decrease arising from the fall in price of coal. The total output of coal was the highest hitherto recorded. The outputs of ores of iron, copper, and lead show increase, while those of manganese, tin, and uranium ores show decrease.

In the *Proceedings* of the Bristol Naturalists' Society (n.s., vol. x., part iii.) Prof. Lloyd Morgan and Prof. S. H. Reynolds give particulars of the field relations of the Carboniferous volcanic rocks of Somerset. There is also an interesting article by Mr. W. H. Wickes on the Rhætic bone-beds, the author pointing out that there is no regular and persistent bed, but thin layers of varying extent occur on different horizons, due to the former presence and destruction of shoals of carnivorous fishes and saurians, while the occurrence of small pebbles in the bone-beds is attributed to the fact that large sea fish often have stones in their stomachs. Mr. H. B. Woodward contributes a memoir on the late Robert Etheridge, dealing more especially with his work in the Bristol area.

In the *Proceedings* of the Cotteswold Naturalists' Field Club (vol. xv., part i.) Messrs. J. W. Gray and G. W. S. Brewer direct attention to the evidence of a Celtic settlement on Cleve Hill, prior to the Roman occupation of that part of the country; among the domestic animals were the horse, ox, sheep, pig, dog, and fowl. Mr. L. Richardson contributes an article on the Rhætic beds of Worcestershire.

A study of sands and sediments has been commenced by Mr. T. Mellard Reade and Mr. Philip Holland (*Proc. Liverpool Geol. Soc.*, 1904). So far as their investigations have proceeded, they are led to believe that purely mechanical micro-sediments may constitute a much larger proportion of the rocks than has been hitherto suspected. Moreover, their experiments show the persistent retention of detrital carbonate of lime in extremely fine subsidence-matter, and suggest that deep-sea limestones may sometimes be formed as detrital accumulations.

The twenty-eighth annual report of the Department of Geology and Natural Resources, Indiana, under the direction of Mr. W. S. Blatchley, State geologist, is accompanied by an excellent geological map of the State on the scale of an inch to four miles, with explanatory descriptions by Dr. T. C. Hopkins and Dr. A. F. Foerste. The formations represented are Ordovician, Silurian, Devonian, Lower Carboniferous, and Coal-measures. The petroleum producing areas are specially marked, that industry having become one of the greatest in the State. Special reports are contributed on this and on the lime industry, and there is also an article on the stratigraphy and palæontology of the Niagara formation by Mr. E. M. Kindle, with twenty-five plates of fossils.

<sup>1</sup> Some of the atlases founded on portolani, such as the *Carte Catalane* of 1375, really illustrate the travels of the thirteenth and fourteenth centuries, e.g. Marco Polo's. But this is strictly in the way of explanation of a great geographic text.

A comprehensive memoir on the geology and ore-deposits of the Bisbee Quadrangle, Arizona, by Mr. F. L. Ransome, appears as one of the "professional papers" of the United States Geological Survey (1904). This district became famous for its production of copper-ore in 1880, and was connected with the railway system as recently as 1902. Hence Mr. Ransome has found himself obliged to invent names—and pleasing ones of Spanish origin—for several topographic features. His plates show how the geological structure of the country can be read on many of the hill-sides with the clearness of a diagram; in several respects they remind one of the bare dry landscapes in the Mesozoic areas of the Basses Alpes. The fossiliferous beds include Middle Cambrian, Devonian (apparently conformable on these), Lower and Upper Carboniferous (both marine), and Cretaceous, resting unconformably on the preceding beds. The affinities of the strata are with those of Texas. The paper concludes with a discussion of the origin of the copper-ores, in which stress is laid on their concentration from cupriferous iron-pyrites, deposited in metamorphosed limestone.

In the *Proceedings* of the Royal Society of Victoria (vol. xvii., n.s., part i.) Messrs. F. Chapman and G. B. Pritchard commence an article on the fossil fish-remains from the Tertiaries of Australia. They deal with the description, range in time, and distribution of the sharks, and they observe that *Asteracanthus*, hitherto known only from Secondary strata, extended beyond question into the Tertiary seas round southern Australia. In other articles the Silurian Ostracoda and Phyllocarida, and the Tertiary Polyzoa and Mollusca of Victoria receive attention. Prof. J. W. Gregory contributes a paper on the antiquity of man in Victoria, and concludes (contrary to his previously expressed opinion) that, however ancient the Australian aborigines may be, there is no evidence of the long occupation of Victoria by man.

We have received the annual report of the Geological Survey of Canada for the year 1900, issued in 1903; it is accompanied by geological maps, dated 1904, of parts of British Columbia (Atlin Gold-fields), Labrador, Saskatchewan, and Quebec.

A revision of the Palæozoic Palæechinoidea, with a synopsis of all known species, has been contributed by Mary J. Klem (*Trans. Acad. Science, St. Louis*, vol. xiv., No. 1). She remarks that the prevailing characters which may be taken as a basis for classification are:—(1) number of columns in the ambulacra; (2) position and number of the ambulacral pores; (3) ornamentation of the plates; (4) imbrication of the plates; (5) apical system; (6) general shape of the body; and (7) geological position.

An interesting article on the occurrence and distribution of copper in the United States, by Mr. W. H. Weed, appears in the *Mining Magazine* (New York, September). Nearly 700 million pounds of metallic copper were produced in the States during 1903, and in the previous year nearly 300 million pounds were obtained from an area a mile long and half a mile wide at Butte, in Montana, where the Anaconda Mine produces more copper than any other mine in the world. The ores occur in well defined veins in quartz-monzonite, associated with white granite or aplite, which forms dykes and small masses. Dykes of quartz-porphry also occur, and seem to have some genetic association with the ore-bodies. Several mines are 2200 feet deep.

The Geological Survey of Queensland has commenced the issue of *Records*. In No. 1 Mr. B. Dunstan, the acting Government geologist, contributes notes on the occurrence of gold nuggets near Mount Morgan, on phosphate-bearing rocks, asbestos, oriental rubies, &c. Mr. R. Etheridge records the occurrence of Halysites in the Chillagoe limestones. We have received also *Publications* Nos. 191 and 192, on the tin, copper, and silver mining in the Stanthorpe district, by Lionel C. Ball, and on the Herberton tin field, by Mr. W. E. Cameron.

Some Upper Devonian fish-remains, obtained by Dr. Whitman Cross from Colorado, are described by Mr. C. R. Eastman (*Amer. Journ. Sci.*, October). The remains belong to the genera *Bothriolepis* and *Holoptychius*. In the same journal a number of fossil turtles belonging to the Marsh collection in Yale University Museum are described and figured by Mr. O. P. Hay. Many of the specimens are from the Laramie deposits of Wyoming.

## SCIENTIFIC RESEARCH IN THE PHILIPPINE ISLANDS.

THE occupation of the Philippine Islands by the United States has been quickly followed by the establishment of laboratories, and already a large amount of scientific work has been done, and several valuable reports have been issued.

The report<sup>1</sup> under review deals with the year ending September, 1903. The permanent buildings of the Government laboratory at Manila were completed last April, and comprise a serum laboratory for the preparation of therapeutic sera and vaccine lymph with attached paddocks and animal houses, a chemical laboratory, a biological department for the prosecution of pathological, entomological, and botanical research, a marine biological station, a bureau of weights and measures, and a library.

About one-third of the volume is occupied with a report on trypanosomiasis by Dr. Musgrave and Mr. Clegg, with special reference to the existence of surra among the horses in the Philippines. At the same time a very complete review of our present knowledge of trypanosomiasis is given, the various species are described, and the symptomatology and prophylaxis are discussed. The report, which is a very valuable one, is copiously illustrated with excellent photographs, temperature charts, &c. Several other papers of pathological interest are included in the volume; also an account of rinderpest inoculation.

Another valuable report is on the gutta-percha industry and the various gutta-percha-producing trees, and is illustrated with a number of photographs of species of *Paladium* and *Payena*, methods of collection of the gutta-percha, maps of geographical distribution, &c.

The final third of the volume contains the report of Mr. Charles Banks, the Government entomologist, and gives an account of the insect pests attacking the cacao. This, like the rest of the papers, is copiously illustrated with excellent photographs.

The volume reflects the greatest credit on the staff of the laboratory, but the complete omission of a table of contents and an index should be remedied in future issues.

R. T. HEWLETT.

## UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BIRMINGHAM.—A chair of music has been established by an endowment of 10,000l. given for that purpose by Mr. Richard Peyton, of Birmingham. The chair has been accepted by Sir Edward Elgar; but the intention of the university authorities is by no means to interfere in any way with his work as composer, and he will be left free to develop the chair gradually and on such lines as he, in consultation with other members of the Senate, may think fit.

Dr. Arthur Robinson, of King's College, London, has been elected to the chair of anatomy, vacated by the appointment of Dr. Windle to the presidency of Queen's College, Cork. The new professor will assume office in January.

A new chair of electrical engineering has been established as a supplement to the lectureship in the same subject held by Dr. D. K. Morris. The first occupant of the chair will be Mr. Gisbert Kapp, now lecturer at Charlottenburg. He is not expected, however, to return to this country until the autumn of next year, and his appointment will not take effect until October, 1905. Meanwhile, and subsequently, Dr. Morris and his staff will continue their work as before. The new and large buildings for the department will be ready by that time. A competent assistant will have to be elected to assist Prof. Kapp in the drawing office for dynamo and central station design.

Prof. Burstall will continue to occupy his chair, the title of which will be changed to "Mechanical Engineering," and he will have control over a great engineering block and the power station.

It is not improbable that a special chair of civil engineering in the narrower sense will be established.

<sup>1</sup> Report of the Superintendent of Government Laboratories in the Philippine Islands for the Year ended September 1, 1903.